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# Positive Effects of Bilingualism on Cognition and Language Acquisition

## Abstract

Bilingual education and bilingualism still remains a controversial field in educational policy among scientist and in public. This article aims to present the research results on positive effects of bilingualism on cognitive awareness and language acquisition. The first section of the paper presents different attitudes towards bilingualism. The second part of the article describes the research results on positive effects of bilingualism on metacognitive awareness. The third part of the article analyzes the studies on positive effects of bilingualism on language acquisition. I argue that bilingualism has advantages on metacognitive awareness and language acquisition and therefore, it is very important for the educational institutions to develop and implement effective bilingual programs in order to take the advantage of the strengths of bilingualism.

***Keywords****: Bilingual education, bilingualism, educational policy, metacognitive awareness*

**Introduction**

The research findings are mostly positive about the effects of bilingual education on children's language awareness and cognitive functioning (Bekerman, 2005). Skutnabb-Kangas and Garcia identified several positive effects of bilingual education (1995): (a) competence in at least two languages; (b) equal opportunity for academic achievement; (c) cross-culturally and positive attitudes toward self and others. In spite of positive research findings and benefits of bilingual education its still remains a controversial field in educational policy (Bekerman, 2005).

This article presents the research results on on positive effects of bilingualism on cognitive awareness and language acquisition. There are some myth and stereotypes abount

the negative effects of bilingualism. These stereotypes present in a society as well as in scientific groups. These myths and stereotypes are mostly based on the early research findings on IQ of bilinguals and monolinguals. These studies showed that monolinguals had high IQ compared to bilinguals. The conclusion was drawn that bilingualism was the reason for lower results of bilinguals in IQ test. However, these studies lack the validity and the research findings were not valid.

The modern globalized society changed attitudes toward bilingualism and bilingualism became a norm and not an exception. Bilingualism is important to operate effectively in a diverse and globilized world. The reseach studies take more attention on issue of bilingualism and late studies are more valid and replicable. The recent research studies of bilingualism shows the positive social, linguistic and codnitive effects of bilingualism.

The research on bilingualism and cognitive development suggests that bilinguals may have some advantage over their monolingual peers. For instance, the size of their total vocabulary across both languages of bilingual kid is greater than that of a monolingual child in a single language. We will describe research findings of the positive effects of bilingualism and cognitive development in the next chapter of the article.

**Positive effects of bilingualism cognitive awareness**

This part of the article describes the research results on effects of bilingualism on cognitive development. Lanco-Worrall (1972) conducted the research and tested the sound and meaning separation in 30 African-English bilinguals aged four to nine. In the first experiment, a typical question was: 'I have three words: CAP, CAN and HAT. Which is more like CAP: CAN or HAT?" A child who says that CAN is more like CAP would appear to be making a choice determined by the **sound** of the word. That is, CAP and CAN have two out of three letters in common. A child who chooses HAT would appear to be making a choice based on the **meaning** of the word. That is, HAT and CAP refer to similar objects". Lanco-Worrall (1972) showed that, by seven years of age, there was no difference between bilinguals and monolinguals in their choices. Both groups chose HAT, their answer being governed by the meaning of the word. However, with four-to-six-years-olds, she found that bilinguals tended to respond to word meaning, monolinguals more to the sound of the word. This led Lanco-Worrall (1972) to conclude that bilinguals: reach a stage of semantic development, as measured by our test, some two-three years earlier than their monolingual peers" (p. 1398 seen in Baker, 2006).

Lanco- Worral conducted second stage of his experiment. During the second stage he asked the following question to the participants: "Suppose you were making up names for things, could you call a cow 'dog' and a dog 'cow'? Based on experiment results, the researcher concluded that monolinguals tend to be bound by words; bilinguals tend to believe that language is more arbitrary. "For bilinguals, names and objects are separate. This seems to be a result of owning two languages, giving the bilingual child awareness of the free, non-fixed relationship between objects and their labels" (Baker, 2006, p.155)

Another important research conducted Ben-Zeev in this direction (seen in Baker, 2006). Ben-Zeev developed a special test so called "The Symbol Substitution Test". Researcher asked children to substitute one word for another in sentence. For example, they had to use the word 'macaroni' instead of 'I' in a sentence. Respondents have to ignore word meaning, avoid framing a correct sentence and evade the interference of word substitution in order to respond to the task correctly. The research revealed that "bilinguals … to be superior on this kind of tests, not only with regard to meaning, but also with regard to sentence construction" (Baker, 2006, p.155).

The recent studies were concentrated to compare the results of bilingual and monolinguals in terms of the process of thinking. Particularly the information processing, memorization and language processing approaches in monolinguals and bilinguals were studied by researchers (Baker, 2006). The research findings underlined the interesting patterns. Bilinguals showed good results for example in problem solving and getting correct mathematical solutions (Baker, 2006). For example research studies of McLeay in 2003 (seen in Baker, 2006)) showed that adult 'balanced' bilinguals had better results in dealing with complex mathematical spatial problems. The studies of Kessler and Quinn (1980, 1982) revealed that bilinguals were superior on scientific problem solving compared to their monolingual peers (seen in Baker, 2006).

Recent research is focused on metacognitive awareness of bilingual children. The several research conducted by Ellen Bialystok is interesting in this respect. Bialystok analyzed her research findings in the context of cognitive development and grouped them into two categories: (a) Development of stable executive processing; (b) Protection from the decline of executive processes (Bialystok, 2007). We will briefly describe the research studies and the findings in each category:

### *(a)* Development of stable executive processing

Ellen Bialystok conducted two studies to compare stability of executive processing of monolinguals and bilinguals. The first study used the "Simon task" to measure intentional processing and executive control of monolingual and bilingual participants. In the Simon task, participants are told to press the right key if they see a green square and the left key if they see a red square. Red and green squares were displayed on the screen on either the right or left side. The requirement from the participants was to respond with the correct key as quickly as possible (Bialystok, 2007).

97 adults were participated in the experiment. Half of the participants were fluent bilinguals. The experiment consisted of different tasks in different conditions with different difficulties. The monolinguals and bilinguals were drawn from the same undergraduate university population, all were experienced computer users and all were comfortable with this type of task, which demanded fast and accurate responding (Bialystok, 2007). Two types of stimuli, coloured squares and directional arrows were used in the experiment and the reaction on these stimulus by participants were studied. "the main challenge is to remember the arbitrary rule that associates each colour with a response key; for the arrows task, the main problem is to resolve the conflict between the spatial codes given by the direction of the arrow and its position. The rule is to press the key showing which way the arrow is pointing, so an arrow in the same screen position as its directional indication is easier than one in the opposite position. The difficulty is only in the conflict between these two cues, because there is no effort required to remember the mapping between the direction and the correct keys: right arrows press right, left arrows press left. Monitoring and switching were manipulated in both tasks by creating conditions that differed in the number of inter-trial switches that occurred in each block of trials. A switch trial was one in which the response was different from that required on the previous. The need for frequent changes in response requires more vigilance and more monitoring, increasing the general processing demands. Evidence for the success of this manipulation and the accuracy of its interpretation is that blocks that contained many inter-trial switches took consistently longer to perform than comparable blocks that contained fewer inter-trial switches" (Bialystok, 2007, p. 217)

The experiment was conducted with varios conditions. Bilinguals have better results in the experiment condition with the arrows task in a block of trials with many inter-trial switches. This is the condition with the greatest burden on executive processing, which requires higher levels of attentional control, higher levels of monitoring and

switching. In this condition bilinguals demonstrated their superior control over executive processing.

Ellen Bialystok used so called anti-saccade taskş in the second research. 48 adults participated in the experiment. Half of them were bilinguals. The experiment required from participants to resist the automatic attention responses "in which gaze is immediately directed to a flashing object and is influenced by the gaze direction of pictures of eyes in a schematic face on the screen" (Bialystok, 2007, p.217).

There were few differences observed in the experiment between bilinguals and monolinguals. The bilinguals has an advantage in the most difficult condition of the experiment, namely, the anti-saccade condition of the gaze shift task where two cues needed to be suppressed in order to respond correctly, but on all other conditions, the two groups has an equal results (Bialystok, 2007). The experiments of Ellen Bialystok, Simon task as well as anti-saccade task showed an advantage of bilinguals compared to monolinguals in executive control and processing.

The early research stidies of Bialystok is also interesting in this respect. The researcher conducted study of kids of age five to nine. 120 kids participated in the study. The participants were given the sentences with gramatical errors. The participants were asked to construct gramatically correct sentences. The study showed that bilinguals managed to construct the sentences gramatically correctly compared to their monolingual peers (Bialystok, 1987).

Bialystok studied the ability of processing the words and development of a concept of a word in bilingual and monolingual kids (Bialystok, 1987). She conducted three experiments to draw conclusion in this direction. After the experiments, the researcher found, that bilinguals outperform monolingual kids in understanding the meaning of a word. Bilinguals had a better ability to determine the number of words in the sentence.

Based on overview of existing studies some conclusions can be drawn. Bilinguals have some cognitive advantages compared to monolinguals. These advantages are not universally superior metalinguistic abilities (Baker, 2006); however, the bilinguals have the advantages in the tasks, which require the selective control of information (Baker, 2006). Bialystok thinks, that bilinguals have the advantage in controling and not analyzing the information. The reason for that can be the necessity to differentiate between the languages for bilinguals (Bialystok 2001, seen in Baker, 2006).

**(b) Protection from the Decline of Executive Processes**

Two studies of Bialystok and her colleagues are interesting in terms of bilingualism, aging and controlled cognitive processing. The first research study was condected by Bialystok and her colleagues in 2004. The researchers used Simon Task experiment. There were 40 participants in the experiment. The participants composed two language groups and two age groups. Twenty of the participants were younger adults ranging in age from 30 to 54 years (and 20 were older adults ranging in age from 60 to 88 years). The experiments showed that younger as well as older bilinguals outperformed their monolingual peerss (Bialystok *at al*, 2004). The difference between bilinguals and monolinguals was more obvious in older participants of experiment. Based on experiment results, the researchers concluded that "lifelong experiance of managing two languages attenuates the age-related decline in the efficiency of inhibitory processing (Bialystok *et al*, 2004, p. 301).

Ellen Bialystok used the anti-saccade task in her second study. The 48 participants were selected for experiment. The age of participants was between 60 and 70 years. Half of participants were bilinguals. Monolinguals and bilinguals responded at the same rate during the simplest pro-saccade condition., however, older bilinguals were significantly faster compared to monolinguals in more difficult conditions when the control required to resist responding with the congruent response key. "When the gaze direction was added in the more complex version of the task, bilinguals were faster than monolinguals in all conditions. The most difficult conditions required high levels of attention and inhibitory control to resist pressing the same side in the red eye trials and to ignore the misleading information from the eye gaze when it directed attention to the wrong side. The combination of these executive processes was handled better by older bilinguals than monolinguals, suggesting again that these functions had been protected by their experience (Bialystok, 2007, p. 219)

Bialystok studies showed that on one hand bilingual children has an cognitive advantage in processing, categorization and cotrolling the information and on the other hand the age-related decline in the efficiency of inhibitory processing is lower in older bilinguals compared to their monolingual peers. However, the researcher concluded that there is no evidence that bilinguals are in any measurable sense more intelligent than monolinguals. Even more, in some areas, "bilinguals perform less well than monolinguals on tasks requiring rapid generation of words, such as semantic fluency and picture naming" (Gollan *et al*., 2002 seen in Bialystok, 2007, p 220).

It should be noted that bilinguals do not have significant advantage in the cognitive development compared to monolingual peers in such an important component as working memory.The advantage of bilinguals is limited to the stability of cognitive processing (Bialystok, 2007). "The research so far reveals compelling evidence that bilinguals develop executive control earlier and maintain their ability to control those functions longer than monolinguals. Given the fundamental centrality of these executive processes to our everyday cognitive life, this is an altogether promising outcome for bilinguals (Bialystok, 2007, pp.220-221).

The research of Namazi and Thordardottir conducted in 2008 is interesting in this respect. The purpose of the research was to clarify the relationship between bilingualism and controlled attention by considering the contribution of verbal and visual working memory abilities (Namazi & Thordardottir, 2010). The researchers tried to explore the relationship between verbal working memory, visual working memory and controlled attention in bilingual and monolingual children. The specific questions were addressed in this study: (1) Is there a bilingual advantage in bilingual children as compared to their monolingual peers? (2) Is there relationship between visual working memory and a non-verbal test of controlled attention in the visual domain?; (3) Do differences in working memory capacity influence on the differences in performance on a test of controlled attention in the visual modality? (Namazi & Thordardottir, 2010). Forty-five children participated in the experiment. Participants were divided into three groups: (1) 15 French monolinguals (2) 15 English monolinguals and (3) fifteen French-English simultaneous bilinguals (Namazi & Thordardottir, 2010).

The participants in the study were tested individually in daycares, at home or at univeristy. Monolingual children were tested in a single 2- 2.5-hour session, while bilingual children were tested in two separate 2- 2.5-hour sessions (One session for French language test and second session for English language test). The order of testing in English or French was counterbalanced across the bilingual children (Namazi & Thordardottir, 2010).

The participants were given four tasks: (1) *Verbal working memory (WM)*- The idea of the task was to give the participants the long set of sentences. Participants had to (a) Judge the truth value of each sentence; and (b) to recall the final word of each sentence. Each child received two scores: one out of 42 for the truth judgment and the other also out of 42 for recalling the final word; both scores were converted to percentages (Namazi & Thordardottir, 2010). (2) *Verbal short-term memory (STM)*- A test were administered to all

children to assess verbal short term memory abilities in English and in French. The words were ranging from 2 to 5 syllables. Totally, there were 40 non-words on both the English and French non-word repetition tests. Participants listened to each word and had to repeat the word as they heard it (Namazi & Thordardottir, 2010); (3) *Visual working memory (WM)*- This task was used to assess the children's visual working memory capacities, Participants were presented with Sponge Bob characters. Participants "were shown a matrix of cells (3 cm 2 ) with Sponge Bobs appearing in half the cells; after a 2-s delay, the Sponge Bob characters disappeared and the child had to indicate by touching the location on the matrix, using a touchscreen, where the figures had been" (Namazi & Thordardottir, 2010, pp. 604-605); (4) *Controlled attention (CA) in the visual domain*- The task used a response box attached to a laptop computer, participants were instructed to press a red button when a red square appeared, and to press a blue button when a blue square appeared on the computer screen. The red button was located on the left and the blue on the right of the response box. 72 (36 congruent and 36 incongruent) tasks were given to the participants of the study (Namazi & Thordardottir, 2010).

The finding of the study was that visual working memory (WM) is highly correlated with visually controlled attention (CA) and both bilingual and monolingual children with better visual working memories have the better controlled attention. There was no differences observed between bilinguals and monolingual in controlled attention in this study.

**Positive Impact of Bilingualism on Language Acquisition**

Some experts think that the process of attaining two languages simultaneously is different from the process of learning one language among monolinguals. With this regard, it is interesting to review the study by Gathercole (2007) which examined two groups English-language and French-language bilinguals in Miami and English-Welsh bilinguals in North Wales. The study revealed the following findings: (a) Majority of the bilinguals and and monolinguals develop the same systems of the language attainment and the follow the same trajectory; (b) Among the participants of the study bilinguals showed need for more time for finding a specific word as compared to monolinguals. However, majority of the bilinguals did not differ from their monolingual counterparts the timing of the process of finding words; (c) Monolinguals and bilinguals were distinct in expressing themselves consistently, however, eventually this difference became minimal; (d) Development of the language among monolinguals and bilinguals is not different.

When attaining two languages bilinguals follow the same trajectory as monolinguals.

Cenoz and Valencia (1994) studied level of the English language knowledge among 320 Basque-Hispanic bilinguals and Spanish Monolinguals. According to the study, the Basque language was not used until 1978. In 1978 it became possible to receive education in the Basque language, as well as use the language in public service and mass media. Increase in the use of the Basque language is associated with the increased respect to the Basque identity. Eventually the Basque language became the main means of communication, as well as official language. The Basque and Spanish languages are used as a language of instruction at schools, as well as they are delivered as an academic disciplined (p. 197). Cenoz and Valencia measured the intellectual level of the participants of the study by social-economic status (occupation of fathers), attitudes towards the population speaking the language (English), motivation to learn English and frequency of its use. The level of the knowledge of the English language was determined by the oral interview. In addition to this, a listening test and reading tests were used. The reading test required them to find relevant information for finding various tasks. Finally, they had to compose 250 words. In addition to this, vocabulary and grammar tests were used (each item in the test had three optional answers). The results showed that motivation, level of intellectual development, frequency of the use of English language and age are significant determinants of the achievements in the English language. The study also revealed that bilingualism significantly advances acquisition of English as a second language. Moreover, above-mentioned four factors (motivation, level of intellectual development, use of the English language and age) do not interact with bilingualism. Therefore, Cenoz and Valencia presented positive affect of bilingualism on the attainment of the third language and concluded that effects of motivation, level of intellectual development, use of the English language and age are absolutely independent from the affect of bilingualism.

Tomas (1988) conducted a study among sixteen bilingual students of English-Spanish College who studied Spanish as a third language. Ten of them were natives of English language, who studied Spanish as a second language in Texas where 51% of population is Spanish-speaking. Bilingual students were divided into 2 groups: (1) English-language students who studied Spanish through formal learning – 10 students; (2) English-language students who studied Spanish through informal learning at home – 6 students. Several control variables were identified for the research by Tomas: Socio-economic status of the participants, frequency of using the French language, teacher, instructional methods and

textbooks. The process of the language development was measured by language tests. The researchers used a modified version of the motivation questionnaire by Gardner and Lambert for measuring motivation among two groups of the study. Statistical analysis of the questionnaires showed that the level of motivation was similar in both groups. At the end of the first semester, the knowledge of French language was measured by the vocabulary and grammar test of French language. The vocabulary test included pure French words, as well as composed words with visual or semantic links to the Spanish language. Grammar test included separate sentences. The participants had to complete the sentences. They were given three possible options for completing the sentences. Out of these three options, only one was grammatically correct. The grammar test assessed word order, agreement of subject and verb, agreement of adjectives, and composition of negative sentences. The next task of the study was to compose a 10-sentence long essay. These essays were assessed by native French speaker specialists. They assessed clarity of the text and ranged the results of the students on the scale from zero to five. The statistical analysis of the results, bilinguals showed better results as compared to monolinguals in French vocabulary and grammar. The results also showed bilinguals, receiving formal education in two languages had higher results as compared to those receiving education only in English. Based on these results Tomas showed that bilinguals had higher achievements as compared to monolinguals. In addition to this, the fact that bilingual students with formal education outperformed monolingual students (in terms of formal education) indicates that full comprehension of the language leads to the superiority of bilinguals as compared to those who learn the second language informally. One should be careful in generalizing findings of the research by Thomas, as the number of participants was very limited.

Sagasta & Pilar (2003) examined 155 Basque-Spanish bilingual students in Spain, in the Basque province, where the Basque language is a minority language and the Spanish is a majority language. According to the National Curriculum, the Spanish language is given 3-4 hours a week. Also, English is taught as a foreign language. The participants of the study were 8-year old third-graders. Half of these students received formal education in the Basque language; the second were education through the immersion bilingual education model. The study revealed that all students had good results in the Basque language. Those students, who used the Basque language more frequently, showed significantly higher results in English.

## Conclusion

Studies reviewed in the article reveal superiority of bilingualism in metacognitive awareness and language acquisition. Despite this advantage, bilingual education is still considered as a controversial issue among the education policy makers as only effective bilingual programs ensure balanced bilingualism and development of language competencies in both languages. Ineffective bilingual programs may even become a barrier for a language acquisition, as well as for overall academic achievement. Therefore, it is very important for the educational institutions to develop and implement effective bilingual programs in order to take the advantage of the strengths of bilingualism.

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